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LIFE FROM SPACE — A HISTORY OF PANSPERMIA

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> 'Long experience has taught me that I am quite as capable of furnishing plausible explanations of imaginary as I am of real phenomena.'
> J. D. Bernal, *Life Beyond Tellus*

The idea that life did not originate on earth but invaded our planet from outer space, and indeed may still be reaching the earth from outside, has received considerable attention in recent years. In particular, the writings on this subject of Sir Fred Hoyle and Chandra Wickramasinghe (see, for example, Hoyle & Wickramasinghe, 1978, and Hoyle, 1980) have gained wide publicity and aroused heated controversy. What is less widely known is that theories of an extra-terrestrial origin of life on earth form a long-standing and by no means peripheral tradition in the history of ideas on the origin of life.

My aim here will be to examine this tradition and to ask whether earlier conflicts concerning the source of life on earth can throw any light on current debates. Historically, these conflicts centred on the question of whether life is a fundamental or an emergent feature of the universe, opposing views that can be traced back to the pre-Socratic philosophies of Anaxagoras and the atomists, respectively. It was not until the 1860s, however, that the issue came to be of serious interest to scientists, and this article will be concerned with the period after 1860.

How the problem came into focus

Speculation on the origin of life was traditionally the prerogative of philosophers and theologians, and experimental research bearing on the question has only gained impetus in the last thirty years. The metaphysical monopoly on the problem, however, had been broken much earlier: scientists took the question into their province when, around 1860, three scientific developments converged to bring the problem of the origin of life on earth into focus. First, the increasingly influential Kant-Laplace hypothesis on the nebular origin of the solar system implied that in the early stages of geological history the earth's surface was far too hot to sustain living organisms. In other words, terrestrial life could not be co-aeval with the earth and must have made its first appearance in the absence of pre-existing organisms. Secondly, Darwin's theory of evolution demanded some starting-point, some type of primordial cell from which all present forms of life had ultimately descended. Darwin himself made no attempt in his Origin of Species (1859) to explain how such primordial organisms could have come into being on a once lifeless earth, but his work encouraged a search for an explanation of this question in terms of natural causes.

The third issue created an acute problem: Pasteur's experiments on spontaneous generation, which earned him the Prix Alhumbert in 1860, showed that sterilised infusions of organic matter remain lifeless providing that contamination with pre-existing organisms is prevented.